INTERNATIONAL JOURNAL OF APPLIED BIOLOGY AND PHARMACEUTICAL TECHNOLOGY

www.ijabpt.com ISSN : 0976-4550

Volume-6, Issue-2, April-June-2015 Coden IJABFP-CAS-USA Copyrights@2015

Received: 20th Jan-2015 Revised: 21st Feb-2015 Accepted: 23rd Feb-2015

Research article

BIODIVERSITY ON THE FATTY ACID PROFILE OF RHIZOBIAL STRAINS OF *PITHECELLOBIUM DULCE* (BENTH)

R. Sagaya Giri* and S. Dhanalakshmi

*PG & Research Department of Botany, Kundhavai Naachiyar Govt. Arts. College for Women (Autonomous), Thanjavur - 613 007.
PG & Research Department of Botany, Govt. Arts. College, Ariyalur – 621 713.

ABSTRACT: Fatty acid profiles of strains grown under standardized conditions have been used for identification and classification of many bacteria. In this present study, fatty acid analysis of five rhizobial isolates of leguminous tree *Pithecellobium dulce* at five different localities were carried by gas chromotagraphy, in which totally fifteen fatty acids were identified. But all the fatty acids were not observed in a single isolate though they are isolated from a single species.

Key words: *Pithecellobium dulce,* Fattyacid, Agar (YEMA) medium.

INTRODUCTION

The role of tree legumes in forest management has assumed special importance in the present context of energy crisis faced acutely by the developing nations. The plantations of the tree legumes on waste lands provide food, fodder, fuel and timber besides improving the soil fertility through the natural association with Rhizobium. Rhizobium-Legume plant symbiosis occurring in nature. With the isolation and characterisation of new isolates, there is an urgent need to update the taxonomy of Rhizobium. The most recent and convenient method of determining the evolutionary relatedness between organisms are based on comparing the protein, plasmid and fatty acid profiles in addition to DNA sequence. They are either direct gene products or the genes themselves, so comparisons of fatty acids yield considerable information about true relatedness. Hence fatty acid profile is considered very important and is even used for taxonomic species identification purposes in bacteria (Cummins and Harris, 1956; Abel *et al.*, 1963).

Whole cell fatty acid profiles of strains growth under standardized conditions have been used for identification and classification of many bacteria (Abel *et al.,* 1963; Moss, 1981; Jack Wood *et al.,* 1985 and Moore *et al.,* 1987).

MATERIALS AND METHODS

Study material

Pithecellobium dulce Benth. belongs to the subfamily Mimosoideae of Leguminosae. It produces club shaped, elongated nodules on the roots of the seedlings and trees.

Isolation of Rhizobium

Nodules were collected from the roots of *P.dulce* at five different localities and surface sterilized by using standard techniques (Vincent 1970). These sterilized root nodules were crushed simply with pestle and mortar. The extract was serially diluted with distilled water and inoculated into a yeast extract mannitol Agar (YEMA) medium. The Rhizobium was confirmed by congo red rest, Hofer alkaline test and staining of poly-ß-hydroxy butyrate test (Mc Kinney, 1953) and mass cultured.

Analysis of fatty acids

Fatty acids analysis of five rhizobial isolates of *P.dulce* were carried out by gas chromatography according to (Miller and Berger, 1985).

RESULT AND DISCUSSION

Fatty acid profile of 5 isolates of *P.dulce* were carried out by gas chromatography, in which totally fifteen fatty acids were identified. All the fatty acids were not observed in a single isolate. Maximum number (10) of fatty acids were observed from the isolates (P1 and P3) of *P.dulce* followed by (9) in *P.dulce* (P5). The remaining isolates (P2 and P4) showed eight fatty acids each (Table -1). Of the isolates P1 and P3 showed identical fatty acids. Similarly the fatty acid profile of P2 and P4 was identical (Table – 1). Fattyacid profile is considered very important and is even used for taxonomic species identification purposes in bacteria (Abel *et al.*, 1963). A study in which 14 strains of *Azospirillum* were analysed for their cellular fatty acid content and also demonstrated that the genus could be sub divided based on the fatty acid content (Schenk and Werner, 1988). The present finding revealed that the isolates of (P1 and P3) and (P2 and P4) have the same cellular fatty acid profile with each other. But the fatty acid profile of P5 differ in both profiles. Thus the fattyacid profile of 5 rhizobial isolates of *P.dulce* showed 3 distinct (P1 and P3, P2 and P4 and P5) groups even though they were isolated from a same species *P.dulce.*

Table 1: Fattyacid profile of 5 different rhizobial isolates of P. dulce (mg/g of Lipid)

S.No	Carbon Number	Name of fatty acid	Rhizobial isolates of *P.dulce*				
			P1	P2	P3	P4	P5
1	C:10	Capric acid	1.34	0.54	0.32	0.50	0.28
2	C:12	Lauric acid	15.48	-	15.43	-	-
3	C:13	Tridecanoic acid	-	0.09	-	0.08	0.04
4	C:14	Myrestic acid	0.65	2.09	0.61	2.11	-
5	C:15	Penta decanoic acid	0.15	8.32	0.17	8.52	-
6	C:16	Palmitic acid	0.07	-	0.05	-	0.28
7	C:17	Hepta decanoic acid	0.53	-	0.59	-	0.08
8	C:18	Stearic acid	0.69	-	0.67	-	0.85
9	C:20	Arachidic acid	0.25	-	0.28	-	0.78
10	C:21	Heneicosanoic acid	-	0.14	-	0.13	0.15
11	C:22	Behenic acid	-	0.01	-	0.01	0.11
12	C:23	Tricosanoic acid	-	0.10	-	0.18	-
13	C:24	Lignoceric acid	-	1.02	-	1.07	-
14	C:16:1	Palmitioletic acid	3.07	-	2.08	-	1.32
15	C:18:1	Oleic acid	0.92	-	0.90	-	-

REFERENCES

Abel, KH. Deschmering and Peterson, J.I. (1963). Classification of microorganisms by analysis of chemical composition. Feasibility of Utilization gas Chromatography. J. Bacterial, 85:1039-44.

Cumminhs, CS. Harris, H. (1959). The chemical composition of the cell wall is some gram positive bacteria and its possible value as a taxonomic character. J. Gern. Microbial, 14: 583-600.

Jackwood, MW, Sasser, M, Saif, YM. (1985). Contribution to the taxonomy of the *turbey coryza* agent; Cellular fatty acid analysis of the bacterium. Avian Dis. 30: 172-78.

McKinney, R. (1953). Staining bacterial polysaccharides. J. Bact, 66: 453-54.

Miller, L, Berger, T. (1985). Bacteria identification by gas chromatography of whole cell fatty acids. Gas chromatography appl. Note, Howlett Packard; 228-41.

Moore, LVH, Johnson, JL, Moore, WEC. (1987). *Selenononasnoxin sp*. Nov. *Selenonus flueggei sp*. Nov.*selenomonos infelix sp*. Nov. *Selenomonas dianae sp*. Nov. and *Selenomonas artemidis* sp. Now. From human gingival *cevices* Intt. J. Syst. Bacterial 36: 271-280.

Moss, CN. (1981). Gas-liquid chromatography as an analytical tool in microbiological J. Chromatohr. 203:337-47.

Schenk, SV, Werner, D. Fatty acid analysis of four *Azospirillum* species reveals three groups 1988; 203:337-47.

Vincent, JM. (1970). A manual for the practical study of root nodule bacteria. In International biological programme Hand book. No. 15, Oxford Blackwell 73-97.

ISSN : 0976-4550

INTERNATIONAL JOURNAL OF APPLIED BIOLOGY AND PHARMACEUTICAL TECHNOLOGY

Email : ijabpt@gmail.com

Website: www.ijabpt.com